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**REMARKS**

Claims 1-27 are all the claims pending in the application. Claims 4-5, 11-12, 19-20 and 24-25 stand rejected on informalities, and 1-27 stand rejected on prior art grounds. Applicants respectfully traverse these objections/rejections based on the following discussion.

**I. The 35 U.S.C. §112, Second Paragraph, Rejection**

Claims 4-5, 11-12, 19-20 and 24-25 stand rejected under 35 U.S.C. §112, second paragraph. The Office Action rejects the foregoing claims arguing that future or unknown technology generations cannot be claimed. In response, Applicants note that the claims do not attempt to claim a future or unknown technology. To the contrary, the claims define a system and method that provides the costs of future or unknown technologies and the two concepts are fundamentally different. Applicants agree that it would be improper to claim something that is not known. To the contrary, the claims define something that is known, that being the cost of future technology generations, the details of which are not known. Indeed, this is one of the benefits of the invention. More specifically, the invention allows the costs of future or unknown technology generations to be determined, even without the specifics of such future unknown generations being currently known.

Thus, it is Applicants position that the future or unknown technology is not currently being claimed, but instead the cost associated with future or unknown technologies is what is being claimed. This cost is well described in the specification and is free of any vagueness. Further, the claims have been amended to more clearly identify that the unknown or future technology generation is one that is "yet to be developed." Applicants submit that the revised wording, though similar in concept to the previous wording of unknown or future technologies, should be more acceptable because, while the terms of "unknown" or "future" have been proposed as being vague, the terminology "yet to be developed" more clearly describes the situation where the technology is currently unknown and will be developed in the future. In view

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of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

## II. The Prior Art Rejections

Claims 1-27 stand rejected under 35 U.S.C. §102(b) as being anticipated by "21<sup>st</sup> Semiconductor Manufacturing Capabilities", hereinafter "Manufacturing." Applicants respectfully traverse this rejection because, for example, Manufacturing does not teach or suggest the claim feature of "performing a regression analysis on historical costs of historical critical gate dimensions at a fabricator" to create models "showing a relationship between said historical critical gate dimensions and said historical costs" as defined by independent claims 1, 8, and 21 (and similarly defined by independent claim 15).

In the semiconductor art field, the gate dimension (e.g., gate length in a transistor) is substantially the same for each technology generation. Therefore, a new technology generation (or simply "technology") is achieved when the gate dimension is reduced by a significant portion (e.g., greater than 10%). An extension of a current technology will utilize the same gate dimension, but may include other enhancements not related to gate dimension. Businesses are frequently asked to provide costs for products before they have the tools and techniques to produce them. Accurate predictive capability is required to make sound business case decisions regarding which products will be profitable now and in the future. Therefore, there is a need for a method and system that can predict the cost per wafer for future generations of technologies based solely upon historical data of known technologies.

The invention solves the foregoing problem by extrapolating current costs of different technologies to future technologies. In other words, the invention looks at many different technology generations (e.g. 4th-9th generation of silicon-based technologies) and predicts the cost of future unknown generations (e.g., 10th or 11th generation of silicon-based technology). As mentioned above, in silicon-based technology, the generations are defined by relatively large reductions in the dimensions of the gate conductor in a transistor structure. Therefore, the

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invention looks at historical costs for technologies producing different gate dimensions to predict the cost of future technologies that produce even smaller gate dimensions. No previous methodology or system calculates cost across different technology generations. Instead, conventional cost prediction systems only predict cost within one technology generation (e.g., variations of a technology for a given gate dimension).

The inventive regression analysis is performed by treating the lithography generation (or critical gate dimension) as the independent variable and wafer cost as the dependent variable. As the dimension of printed images of chip circuitry decreases (e.g., gate dimension decreases), cost increases exponentially. The regression analysis is actually performed in steps; one step for each section of semiconductor processing, with the results of all equations added together to form a composite equation. Thus, the invention enables the prediction of wafer processing cost before process flows even exist, indeed, even before the technology itself has been defined.

It is possible for the invention to predict wafer processing costs before process flows exist and before the technology itself has been defined because of three main features of semiconductor processing. The first is that semiconductor costs are largely driven by equipment, rather than materials or staffing. Second, while new equipment may be used in different or novel ways to achieve the new groundrules, new equipment is introduced each generation. Third, both of these things are especially true for photolithography and etch tools, which are the most critical tools toward achieving smaller dimensions. What these three features suggest, and what the invention relies upon, is that the cost of silicon-based semiconductors is predictive, even without knowing the specific processing or equipment parameters.

The Manufacturing paper is very general and describes a modeling hierarchy and establishing links and infrastructure between modeling elements to make the entire modeling environment more than the sum of individual components (see page 5, last paragraph in first column, and Figure 4). In addition, the Manufacturing paper illustrates, for example, in Table 5, that proper knowledge management will increase efficiency by providing knowledge to those people who need information so that they can make faster and wiser decisions (page 6, second column, last paragraph). However, other than describing these overall noble goals, the

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Manufacturing paper is silent regarding how such goals would be achieved. To the contrary, the claimed invention very specifically describes a "regression analysis" and other similar specific measures that are not taught or suggested in the Manufacturing paper. While the central paragraph on page 3 of the Office Action argues that Figures 2 and 3 and tables 1 and 2 of the Manufacturing paper illustrated a relationship between costs and dimensions, there is no suggestion within the Manufacturing paper of any form of regression analysis being performed, much less a regression analysis that treats the critical gate dimensions as the independent variable and the wafer cost as the dependent variables. Therefore, it is Applicant's position that the Manufacturing paper does not teach or suggest any method or system that performs a regression analysis on historical costs at a specific fabricator in order to create models that will allow the cost of future, unknown designs to be simulated, as in the claimed invention.

More specifically, the Manufacturing paper describes an operational model that simulates different factory layouts. It answer questions like (quoting from page 4), "how much equipment or how many people are needed to perform a given number of activities; how can a factory be laid out for improved efficiency..." etc. That model answers "what-if" questions concerning optimal staffing levels, tooling levels, and layout of the facility. For example, the model in the Manufacturing paper predicts the overall savings resulting from CFM vs. FFM product flow, and changes in cycle time, lot size, or operational policies. The scope of the model in the Manufacturing paper is very broad, treating the factory floor, its area, the entity itself, and the overall business enterprise as different components.

The claim invention differs significantly from this. The claimed invention presupposes an existing fabricator, complete with people and tools in a given layout and answers "what-if" questions concerning the costs of future unknown devices that could be produced by that fabricator. For a given factory and product mix, the invention can predict the cost of the different unknown future product types. Thus, the invention enables a factory to optimize cost and revenue by trying out different product mixes.

Therefore, it is Applicant's position that the Manufacturing paper does not teach or suggest "performing a regression analysis on historical costs of historical critical gate dimensions

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at a fabricator" to create models "showing a relationship between said historical critical gate dimensions and said historical costs" as defined by independent claims 1, 8, and 21 (and similarly defined by independent claim 15). Thus, applicants submit that independent claims 1, 8, 15, and 21 are patentable over the Manufacturing paper. Further, dependent claims 2-7, 9-14, 16-20, and 22-27 are similarly patentable, not only because they depend from a patentable independent claim, but also because of the additional features of the invention they define. In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw this rejection.

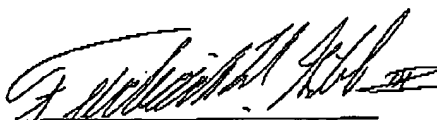
### III. Formal Matters and Conclusion

In view of the foregoing, Applicants submit that claims 1-27, all the claims presently pending in the application, are patentably distinct from the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Please charge any deficiencies and credit any overpayments to Attorney's Deposit Account Number 09-0456.

Respectfully submitted,

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